

1. Record Nr.	UNINA9910826042303321
Autore	Banerjee Arun K.
Titolo	Flexible multibody dynamics : efficient formulations and applications / / Arun K. Banerjee
Pubbl/distr/stampa	West Sussex, England : , : Wiley, , 2016 ©2016
ISBN	1-119-01561-8 1-119-01560-X
Descrizione fisica	1 online resource (339 p.)
Classificazione	TEC009070
Disciplina	621.8/11
Soggetti	Machinery, Dynamics of Multibody systems - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Title Page; Copyright; Dedication; Preface; 1 Derivation of Equations of Motion; 1.1 Available Analytical Methods and the Reason for Choosing Kane's Method; 1.2 Kane's Method of Deriving Equations of Motion; 1.3 Comparison to Derivation of Equations of Motion by Lagrange's Method; 1.4 Kane's Method of Direct Derivation of Linearized Dynamical Equation; 1.5 Prematurely Linearized Equations and a Posteriori Correction by ad hoc Addition of Geometric Stiffness due to Inertia Loads; 1.6 Kane's Equations with Undetermined Multipliers for Constrained Motion 1.7 Summary of the Equations of Motion with Undetermined Multipliers for Constraints 1.8 A Simple Application; Appendix 1. A Guidelines for Choosing Efficient Motion Variables in Kane's Method; Problem Set 1; References; 2 Deployment, Station-Keeping, and Retrieval of a Flexible Tether Connecting a Satellite to the Shuttle; 2.1 Equations of Motion of a Tethered Satellite Deployment from the Space Shuttle; 2.2 Thruster-Augmented Retrieval of a Tethered Satellite to the Orbiting Shuttle; 2.3 Dynamics and Control of Station-Keeping of the Shuttle-Tethered Satellite Appendix 2.A Sliding Impact of a Nose Cap with a Package of Parachute Used for Recovery of a Booster Launching Satellites Appendix 2.B Formation Flying with Multiple Tethered Satellites; Appendix 2.C Orbit

Boosting of Tethered Satellite Systems by Electrodynamical Forces; Problem Set 2; References; 3 Kane's Method of Linearization Applied to the Dynamics of a Beam in Large Overall Motion; 3.1 Nonlinear Beam Kinematics with Neutral Axis Stretch, Shear, and Torsion; 3.2 Nonlinear Partial Velocities and Partial Angular Velocities for Correct Linearization 3.3 Use of Kane's Method for Direct Derivation of Linearized Dynamical Equations 3.4 Simulation Results for a Space-Based Robotic Manipulator; 3.5 Erroneous Results Obtained Using Vibration Modes in Conventional Analysis; Problem Set 3; References; 4 Dynamics of a Plate in Large Overall Motion; 4.1 Motivating Results of a Simulation; 4.2 Application of Kane's Methodology for Proper Linearization; 4.3 Simulation Algorithm; 4.4 Conclusion; Appendix 4.A Specialized Modal Integrals; Problem Set 4; References; 5 Dynamics of an Arbitrary Flexible Body in Large Overall Motion 5.1 Dynamical Equations with the Use of Vibration Modes 5.2 Compensating for Premature Linearization by Geometric Stiffness due to Inertia Loads; 5.3 Summary of the Algorithm; 5.4 Crucial Test and Validation of the Theory in Application; Appendix 5.A Modal Integrals for an Arbitrary Flexible Body [2]; Problem Set 5; References; 6 Flexible Multibody Dynamics: Dense Matrix Formulation; 6.1 Flexible Body System in a Tree Topology; 6.2 Kinematics of a Joint in a Flexible Multibody Body System; 6.3 Kinematics and Generalized Inertia Forces for a Flexible Multibody System 6.4 Kinematical Recurrence Relations Pertaining to a Body and Its Inboard Body

Sommario/riassunto

"This book describes how to build mathematical models of multibody systems with elastic components. Examples of such systems are the human body itself, construction cranes, cars with trailers, helicopters, spacecraft deploying antennas, tethered satellites, and underwater maneuvering vehicles looking for mines while being connected by a cable to a ship"--
